1-1-1981

# Test 1381: Case 1490 Manual Diesel 12-Speed

Tractor Museum
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# NEBRASKA TRACTOR TEST 1381 — CASE 1490 MANUAL DIESEL 12 SPEED

## POWER TAKE-OFF PERFORMANCE

| Power Hp (kW) | Crank shaft speed rpm | Fuel Consumption gal/hr (l/h) | lb/hp.hr (kg/kW.h) | Hp.hr/gal (kW.h/l) | Temperature °F (°C) Cooling medium | Air wet bulb | Air dry bulb | Barometer inch Hg (kPa) |
|---|---|---|---|---|---|---|---|---|
| **MAXIMUM POWER AND FUEL CONSUMPTION** | | | | | | | | |
| **Rated Engine Speed—Two Hours (PTO Speed—1075 rpm)** | | | | | | | | |
| 70.51 (52.58) | 2200 | 4.232 (16.020) | 0.421 (0.256) | 16.66 (3.282) | 182 (83.2) | 51 (10.6) | 75 (23.8) | 28.863 (97.467) |
| **Standard Power Take-off Speed (1000 rpm)—One Hour** | | | | | | | | |
| 68.75 (51.27) | 2047 | 4.002 (15.149) | 0.408 (0.248) | 17.18 (3.384) | 182 (83.1) | 51 (10.6) | 75 (23.8) | 28.845 (97.405) |
| **VARYING POWER AND FUEL CONSUMPTION—Two Hours** | | | | | | | | |
| 62.57 (46.66) | 2296 | 3.932 (14.884) | 0.441 (0.268) | 15.91 (3.135) | 180 (82.2) | 51 (10.6) | 75 (23.9) | ..... ..... |
| 0.00 (0.00) | 2358 | 1.155 (4.372) | ..... ..... | ..... ..... | 172 (77.5) | 51 (10.6) | 75 (23.6) | ..... ..... |
| 31.49 (23.48) | 2310 | 2.422 (9.168) | 0.539 (0.328) | 13.00 (2.561) | 177 (80.6) | 51 (10.6) | 75 (23.6) | ..... ..... |
| 70.79 (52.79) | 2200 | 4.258 (16.118) | 0.422 (0.257) | 16.63 (3.275) | 182 (83.3) | 51 (10.6) | 75 (23.9) | ..... ..... |
| 15.80 (11.78) | 2322 | 1.780 (6.738) | 0.790 (0.481) | 8.88 (1.748) | 173 (78.1) | 51 (10.3) | 75 (23.6) | ..... ..... |
| 46.77 (34.88) | 2288 | 3.149 (11.920) | 0.472 (0.287) | 14.85 (2.926) | 177 (80.6) | 53 (11.7) | 76 (24.2) | ..... ..... |
| **Av 37.90** | **2296** | **2.783** | **0.515** | **13.62** | **177** | **51** | **75** | **28.775** |
| ***Av (28.26)*** | | ***(10.535)*** | ***(0.313)*** | ***(2.682)*** | ***(80.4)*** | ***(10.7)*** | ***(23.8)*** | ***(97.169)*** |

## DRAWBAR PERFORMANCE
## (Front Wheel Drive Disengaged)

| Power Hp (kW) | Drawbar pull lbs (kN) | Speed mph (km/h) | Crank-shaft speed rpm | Slip % | Fuel Consumption gal/hr (l/h) | lb/hp.hr (kg/kW.h) | Hp.hr/gal (kW.h/l) | Temp. °F (°C) Cool-ing med | Air wet bulb | Air dry bulb | Barom. inch Hg (kPa) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Maximum Available Power—Two Hours 7th (3-2) Gear** | | | | | | | | | | | |
| 59.12 (44.09) | 4864 (21.64) | 4.56 (7.34) | 2198 | 6.52 | 4.279 (16.198) | 0.507 (0.308) | 13.82 (2.722) | 188 (86.7) | 47 (8.3) | 61 (16.1) | 29.035 (98.000) |
| **75% of Pull at Maximum Power—Ten Hours 7th (3-2) Gear** | | | | | | | | | | | |
| 48.22 (35.96) | 3707 (16.49) | 4.88 (7.85) | 2306 | 4.67 | 3.708 (14.036) | 0.539 (0.328) | 13.00 (2.561) | 186 (85.6) | 51 (10.4) | 60 (15.6) | 28.980 (97.860) |
| **50% of Pull at Maximum Power—Two Hours 7th (3-2) Gear** | | | | | | | | | | | |
| 33.49 (24.97) | 2499 (11.12) | 5.03 (8.10) | 2339 | 3.16 | 2.977 (11.269) | 0.623 (0.379) | 11.25 (2.216) | 184 (84.4) | 50 (9.7) | 60 (15.6) | 29.040 (98.050) |
| **50% of Pull at Reduced Engine Speed—Two Hours 9th (2-3) Gear** | | | | | | | | | | | |
| 33.42 (24.92) | 2486 (11.06) | 5.04 (8.11) | 1720 | 3.05 | 2.336 (8.843) | 0.490 (0.298) | 14.31 (2.819) | 182 (83.3) | 51 (10.6) | 68 (20.0) | 28.990 (97.890) |
| **MAXIMUM POWER IN SELECTED GEARS** | | | | | | | | | | | |
| 56.63 (42.23) | 8340 (37.10) | 2.55 (4.10) | 2195 | 14.31 | 4th (3-1) Gear | | | 186 (85.6) | 46 (7.8) | 51 (10.6) | 29.050 (98.100) |
| 56.79 (42.35) | 7160 (31.85) | 2.97 (4.79) | 2199 | 10.76 | 5th (1-3) Gear | | | 188 (86.7) | 46 (7.8) | 58 (14.4) | 29.070 (98.170) |
| 58.21 (43.41) | 6200 (27.58) | 3.52 (5.66) | 2200 | 8.51 | 6th (2-2) Gear | | | 189 (87.2) | 46 (7.8) | 58 (14.4) | 29.070 (98.170) |
| 60.24 (44.92) | 4960 (22.06) | 4.56 (7.34) | 2200 | 6.69 | 7th (3-2) Gear | | | 188 (86.7) | 45 (7.2) | 56 (13.3) | 29.200 (98.600) |
| 60.45 (45.08) | 4024 (17.90) | 5.63 (9.07) | 2202 | 5.08 | 8th (4-1) Gear | | | 187 (86.1) | 45 (7.2) | 56 (13.3) | 29.200 (98.600) |
| 58.71 (43.78) | 3471 (15.44) | 6.34 (10.21) | 2199 | 4.51 | 9th (2-3) Gear | | | 188 (86.7) | 46 (7.8) | 58 (14.4) | 29.070 (98.170) |
| 59.05 (44.03) | 2722 (12.11) | 8.14 (13.10) | 2201 | 3.57 | 10th (3-3) Gear | | | 188 (86.7) | 46 (7.8) | 58 (14.4) | 29.070 (98.170) |

**Department of Agricultural Engineering**

**Dates of Test:** March 17-April 2, 1981

**Manufacturer:** J. I. CASE COMPANY, Racine, Wisconsin 53404

**FUEL, OIL AND TIME: Fuel** No. 2 Diesel **Cetane No.** 46.3 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60° *(15°/15°)*** 0.8420 **Fuel weight** 7.011 lbs/gal *(0.840 kg/l)* **Oil SAE** 30 **API service classification** CD-SE **To motor** 2.398 gal *(9.077 l)* **Drained from motor** 1.834 gal *(6.942 l)* **Transmission lubricant** Case TFD fluid **Final drive lubricant** Case ETHB fluid **Front axle lubricant** Case FDL SAE 90 **Total time engine was operated** 45.0 hours

**ENGINE Make** Case Diesel **Type** four cylinder vertical with turbocharger **Serial No.** 220102 11410775 **Crankshaft** lengthwise **Rated rpm** 2200 **Bore and stroke** 3.939″ × 4.500″ *(100 mm × 114.3 mm)* **Compression ratio** 16 to 1 **Displacement** 219 cu in *(3590 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements with centrifugal precleaner **Oil filter** one full flow cartridge **Fuel filter** two paper elements with sediment bowl and screen **Muffler** vertical **Cooling medium temperature control** one thermostat.

**CHASSIS: Type** front wheel assist **Serial No.** 1490/18/11181306 **Tread width** rear 60.75″ *(1543 mm)* to 85″ *(2159 mm)* front 59″ *(1499 mm)* to 71″ *(1803 mm)* **Wheel base** 88″ *(2235 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 37.0″ *(940 mm)* Vertical distance above roadway 33.0″ *(838 mm)* Horizontal distance from center of rear wheel tread 0″ *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph *(km/h)*** first 1.1 *(1.8)* second 1.8 *(2.9)* third 2.2 *(3.6)* fourth 2.8 *(4.6)* fifth 3.2 *(5.2)* sixth 3.7 *(5.9)* seventh 4.7 *(7.5)* eighth 5.7 *(9.2)* ninth 6.4 *(10.3)* tenth 8.1 *(13.0)* eleventh 9.3 *(15.0)* twelfth 16.1 *(25.9)* reverse 1.9 *(3.0)*, 3.8 *(6.0)*, 4.8 *(7.7)*, 9.5 *(15.3)* **Clutch** single dry disc hydraulically operated by foot pedal **Brakes** multiple wet disc hydraulically operated by two foot pedals which can be locked together and hand lever **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 147″ *(3.73 m)* left 147″ *(3.73 m)* (on concrete surface without brake) right 192″ *(4.88 m)* left 192″ *(4.88 m)* **Turning space diameter** (on concrete surface with brake applied) right 308″ *(7.82 m)* left 308″ *(7.82 m)* (on concrete surface without brake) right 398″ *(10.11 m)* left 398″ *(10.11 m)* **Power take-off** 1000 rpm at 2047 engine rpm and 540 rpm at 2077 engine rpm.

## LUGGING ABILITY IN 7th (3-2) GEAR

| Crankshaft Speed rpm | 2200 | 1979 | 1759 | 1537 | 1320 | 1098 |
|---|---|---|---|---|---|---|
| Pull—lbs *(kN)* | 4960 *(22.06)* | 5363 *(23.86)* | 5591 *(24.87)* | 5768 *(25.66)* | 5721 *(25.45)* | 5419 *(24.10)* |
| Increase in Pull % | 0 | 8 | 13 | 16 | 15 | 9 |
| Power—Hp *(kW)* | 60.24 *(44.92)* | 58.20 *(43.40)* | 53.69 *(40.04)* | 48.20 *(35.94)* | 41.14 *(30.68)* | 32.56 *(24.28)* |
| Speed—Mph *(km/h)* | 4.56 *(7.34)* | 4.07 *(6.55)* | 3.60 *(5.79)* | 3.13 *(5.04)* | 2.70 *(4.35)* | 2.25 *(3.62)* |
| Slip % | 6.69 | 7.37 | 7.77 | 8.04 | 7.91 | 7.50 |

| TRACTOR SOUND LEVEL WITHOUT CAB | dB(A) | Front Wheel Drive Disengaged dB(A) |
|---|---|---|
| Maximum Available Power—Two Hours | 93.5 | 94.0 |
| 75% of Pull at Maximum Power—Ten Hours | | 93.0 |
| 50% of Pull at Maximum Power—Two Hours | | 92.5 |
| 50% of Pull at Reduced Engine Speed—Two Hours | | 90.0 |
| Bystander in 12th (4-3) gear | | 84.0 |

## DRAWBAR PERFORMANCE
## (Front Wheel Drive Engaged)

| Power Hp *(kW)* | Drawbar pull lbs *(kN)* | Speed mph *(km/h)* | Crank-shaft speed rpm | Slip % | Fuel Consumption gal/hr *(l/h)* | lb/hp.hr *(kg/kW.h)* | Hp.hr/gal *(kW.h/l)* | Temp. °F *(°C)* Cool-ing med | Air wet bulb | Air dry bulb | Barom. inch Hg *(kPa)* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Maximum Available Power—Two Hours 7th (3-2) Gear** | | | | | | | | | | | |
| 60.31 *(44.97)* | 4831 *(21.49)* | 4.68 *(7.53)* | 2199 | 4.71 | 4.297 *(16.266)* | 0.500 *(0.304)* | 14.04 *(2.766)* | 189 *(87.2)* | 48 *(8.6)* | 61 *(16.1)* | 29.000 *(97.930)* |
| **MAXIMUM POWER IN SELECTED GEARS** | | | | | | | | | | | |
| 55.20 *(41.16)* | 9919 *(44.12)* | 2.09 *(3.36)* | 2275 | 14.68 | 3rd (2-1) Gear | | | 187 *(86.1)* | 44 *(6.7)* | 50 *(10.0)* | 29.050 *(98.100)* |
| 61.52 *(45.88)* | 4931 *(21.93)* | 4.68 *(7.53)* | 2200 | 4.82 | 7th (3-2) Gear | | | 188 *(86.7)* | 45 *(7.2)* | 56 *(13.3)* | 29.200 *(98.600)* |

| TIRES, BALLAST AND WEIGHT | | With Ballast | Without Ballast |
|---|---|---|---|
| **Rear Tires** | —No., size, ply & psi *(kPa)* | Two 18.4-34; 6; 16 *(110)* | Two 18.4-34; 6; 16 *(110)* |
| Ballast | —Liquid (each) | 1218 lb *(552 kg)* | None |
| | —Cast Iron (each) | 500 lb *(227 kg)* | None |
| **Front Tires** | —No., size, ply & psi *(kPa)* | Two 12.4R24; 6; 24 *(165)* | Two 12.4R24; 6; 24 *(165)* |
| Ballast | —Liquid (each) | None | None |
| | —Cast Iron (each) | 82 lb *(37 kg)* | None |
| **Height of drawbar** | | 20 in *(510 mm)* | 20 in *(510 mm)* |
| **Static Weight with Operator**—Rear | | 7965 lb *(3613 kg)* | 4530 lb *(2055 kg)* |
| Front | | 3340 lb *(1515 kg)* | 3175 lb *(1440 kg)* |
| Total | | 11305 lb *(5128 kg)* | 7705 lb *(3495 kg)* |

**REPAIRS and ADJUSTMENTS:** No repairs or adjustments.

**REMARKS:** All test results were determined from observed data obtained in accordance with SAE and ASAE test code or official Nebraska test procedure. Temperature at injection pump was 155°F *(68.1°C)*. Seven gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1381.**

LOUIS I. LEVITICUS
Engineer-in Charge

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Board of Tractor Test Engineers


**Case 1490 Manual Diesel**

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